Math 131 Homework: Day 11

My Office Hours: M & W 12:30–2:00, Tu 2:30–4:00, & F 1:15-2:30 or by appointment. **Math Intern** Sun: 12–6pm; M 3-10pm; Tu 2–6, 7–1pm; W and Th: 5-10 pm in Lansing 310. Website: `http://math.hws.edu/~mitchell/Math131S13/index.html`.

Practice

1. Exam in Lab on Thursday. Review labs, homework (including WeBWorK), MVT. Try the Practice Test problems that will be posted on line. **No graphing or programmable calculators are allowed. I will provide you with a basic calculator.**

- **a)** You should be comfortable with upper and lower sums and general Riemann Sums.
- **b)** You should know your summation formulas and how to use them in limits.
- **c)** You should be able to draw left, right, upper, and lower sums and estimate their values from a graph (including graphs that are below the x-axis).
- **d)** You should know the MVT and be able to draw a graph that illustrates it.
- **e)** You should know the connection between the definition of (net) area and the definite integral and how to use this to estimate definite integrals. You should know how to calculate total area.
- **f)** Know the basic antiderivative formulas. This list now includes $\int \tan x\,dx$ and $\int \sec x\,dx$.
- **g)** Know your integral properties.
- **h)** You should be able to do simple flow or motion problems (finding velocity and position from acceleration).
- **i)** Using the graph of $f(t)$, you should be able to interpret the meaning of $F(x) = \int_a^x f(t)\,dt$ (as net area). You should be able to locate max and min values of F, etc.
- **j)** Know how to use FTC I.
- **k)** You should be able to do all types of substitution problems, including those involving $\arctan u$, $\arcsin u$, $\ln|u|$, and the substitution versions of $\int \tan u\,du$ and $\int \sec u\,du$.
- **l)** You should be able to do definite integrals using the FTC, including those that use substitution (either convert the limits or switch from u back to x at the end of the problem).
- **m)** Average value problems.
- **n)** You should be able to determine displacement and distance travelled from velocity. You should be able to determine velocity and position form acceleration.
- **o)** Simple problems involving area between curves (Section 6.2 covered on Monday).

2. **a)** **Finish Lab 4**. The answers are on line.

- **b)** Start the **Practice Problems** on line. Answers will appear next week.
- **c)** Practice: Try p. 379ff #7, 9, 17, 23, 25.

Hand In Monday:

Finish WeBWorK Day10 (Sunday) and Day11 (Tuesday). Day 11 contains some new and some review material.

1. Suppose that $v(t) = t^3 - 4t^2 + 3t$ m/s on the interval $0 \le t \le 4$.

- **a)** Determine when the object is moving forwards and when it is moving backwards during $[0, 4]$.
- **b)** Determine the displacement (net distance travelled) on the interval $[0, 4]$.
- **c)** Determine the v_{ave} on the interval $[0, 4]$.
- **d)** Determine the TOTAL distance travelled on the interval $[0, 3]$. (NOT $[0, 4]$.)

2. Page 379 #22 and 24.

3. From the practice test: My Honda Accord accelerates from 0 to 88 ft/sec in 13 seconds. Assume that acceleration is a constant, k.

- **a)** Find the velocity function of the car (using the velocities at the two times you can eliminate any constants).
- **b)** How far does it travel in this 13 second period?

4. Integrals are everywhere. We can apply our work to population problems. If we know the growth *rate* of the population (i.e., the derivative of the population), then we can determine actual population values. Page 380 #32. Hint: Either do part (b) first, then part (a) OR read and apply Theorem 6.3 in Section 6.1.

5. Page 381 #50(a).